

Claims

1. A security paper for producing value documents, such as bank notes, passports, identification documents or the like, having a flat substrate (12) provided at least partly with a dirt-repellent protective layer (14) for extending the life time and fitness for circulation, characterized in that the protective layer (14) comprises at least two lacquer layers (16, 18), a first lower lacquer layer (16) being formed by a physically drying lacquer layer applied to the substrate (12) which makes contact with the substrate (12) therebelow and closes its pores, and a second upper lacquer layer (18) protecting the substrate (12) from physical and chemical influences.
2. A security paper according to claim 1, characterized in that the substrate is formed by an unprinted (12) or printed (12, 20) cotton paper.
3. A security paper according to claim 1 or 2, characterized in that the lower lacquer layer (16) forms a smooth and contiguous layer on the substrate.
4. A security paper according to at least one of claims 1 to 3, characterized in that the first lower lacquer layer is elastic.
5. A security paper according to at least one of claims 1 to 4, characterized in that the lower lacquer layer (16) is formed by a water-based dispersion lacquer layer.
6. A security paper according to at least one of claims 1 to 5, characterized in that the first lower lacquer layer comprises a polyurethane.
7. A security paper according to at least one of claims 1 to 6, characterized in that the first lower lacquer layer is based on a water-based dispersion of aliphatic polyester polyurethanes or styrene-acrylic polyurethanes.
8. A security paper according to at least one of claims 1 to 7, characterized in that the upper lacquer layer (18) is formed by a radiation-curing and/or physically drying lacquer layer.

9. A security paper according to claim 8, characterized in that the lacquer layer is formed by a UV-crosslinked lacquer layer, a water-based dispersion lacquer layer or hybrid lacquer layer.
10. A security paper according to at least one of claims 1 to 9, characterized in that the second upper lacquer layer comprises silicones and/or wax.
11. A security paper according to claim 9, characterized in that the UV-crosslinked lacquer layer is based on an acrylate system, the water-based dispersion lacquer layer on a styrene-acrylic system, and the hybrid lacquer layer on a system comprising aliphatic urethane acrylates and acrylates with photoinitiators.
12. A security paper according to claim 8, characterized in that the composition of the upper lacquer layer (18) is selected with respect to brittleness and surface tension so as to obtain a predetermined haptics of the security paper, in particular a predetermined smoothness, sound and/or flexural stiffness.
13. A security paper according to at least one of claims 1 to 12, characterized in that the upper lacquer layer (18) is disposed directly on the lower lacquer layer (16).
14. A security paper according to at least one of claims 1 to 13, characterized in that a further lacquer layer comprising water-based dispersion lacquer is disposed between the upper (18) and lower (16) lacquer layers.
15. A security paper according to at least one of claims 1 to 14, characterized in that the lacquer layers (16, 18) of the protective layer are coordinated with each other in their adhesion properties so as to form a highly resistant bond.
16. A security paper according to at least one of claims 1 to 15, characterized in that the lower lacquer layer (16) has a low glass transition temperature to increase the adhesion and adhesion promotion.
17. A security paper according to at least one of claims 1 to 16, characterized in that the upper (18) and/or lower (16) lacquer layer is transparent and colorless.

18. A security paper according to at least one of claims 1 to 17, characterized in that the upper lacquer layer (18) has antibacterial fungus proofing.
19. A security paper according to at least one of claims 1 to 18, characterized in that the lower lacquer layer (16) is present on the substrate (12) in a coating weight of from 1 to 6 g/m<sup>2</sup>, preferably 2 to 4 g/m<sup>2</sup>.
20. A security paper according to at least one of claims 1 to 19, characterized in that the upper lacquer layer (18) is present on the substrate (12) in a coating weight of from 0.5 to 3 g/m<sup>2</sup>, preferably 1 to 2 g/m<sup>2</sup>.
21. A security paper according to at least one of claims 1 to 20, characterized in that the substrate (12, 20) is printed with characters or patterns (20), and the protective layer (14) is applied to the printed substrate (12, 20) and/or the first lower lacquer layer is printed to which the second upper lacquer layer is applied, and/or the second upper lacquer layer is printed.
22. A security paper according to at least one of claims 1 to 21, characterized in that the protective layer (14) contains at least one gap.
23. A security paper according to claim 21, characterized in that the gap has a security element incorporated therein.
24. A security paper according to at least one of claims 1 to 21, characterized in that the protective layer (14) is applied to the substrate (12) all over.
25. A security paper according to at least one of claims 1 to 24, characterized in that the flat substrate (12) is provided with the dirt-repellent protective layer (14) on its two main faces.
26. A value document, such as a bank note, passport, identification document or the like, characterized in that the value document has a security paper according to at least one of claims 1 to 25.

27. A method for producing a security paper in particular for a value document, such as a bank note, passport, identification document or the like, characterized by the following steps:
  - a) supplying a flat substrate; and
  - b) applying a dirt-repellent protective layer to the substrate, the protective layer being applied by
    - b<sub>1</sub>) applying a physically drying lacquer layer to the substrate as the lower layer of the protective layer to make contact with the substrate therebelow and close its pores; and
    - b<sub>2</sub>) applying an upper layer of the protective layer to protect the substrate from physical and chemical influences.
28. A method according to claim 27, characterized in that
  - b<sub>2</sub>) the upper layer applied is a radiation-curing and/or physically drying layer, and
  - c) the upper layer is crosslinked, cured and/or dried by irradiation with electromagnetic radiation.
29. A method according to claim 27 or 28, characterized in that the flat substrate supplied is a printed or unprinted cotton paper.
30. A method according to at least one of claims 27 to 29, characterized in that the lower layer applied is an elastic, in particular a water-based dispersion lacquer layer.
31. A method according to at least one of claims 27 to 30, characterized in that the lower lacquer layer is applied in an amount of coating which closes the pores of the substrate and forms a smooth and cohesive surface on the substrate.

32. A method according to at least one of claims 27 to 31, characterized in that the lower lacquer layer is applied to the substrate in an amount of from 2.5 to 15 g/m<sup>2</sup>, preferably 5 to 10 g/m<sup>2</sup> (wet weight).
33. A method according to at least one of claims 27 to 32, characterized in that the lower layer is dried prior to application of the upper layer.
34. A method according to at least one of claims 27 to 33, characterized in that the upper lacquer layer applied is a UV-crosslinking lacquer layer, a water-based dispersion lacquer layer or a hybrid lacquer.
35. A method according to at least one of claims 27 to 34, characterized in that the composition of the upper lacquer layer is selected with respect to brittleness and surface tension so as to obtain a predetermined haptics of the security paper, in particular a predetermined smoothness, sound and/or flexural stiffness.
36. A method according to at least one of claims 27 to 35, characterized in that a printed image is printed on the substrate prior to application of the protective layer.
37. A method according to at least one of claims 27 to 36, characterized in that a printed image is printed on the lower lacquer layer after application of the lower lacquer layer, and/or a printed image is printed on the upper lacquer layer after application of the upper lacquer layer.
38. A method according to one of claims 27 and 37, characterized in that the unlacquered or lacquered substrate is printed by the intaglio printing process.
39. A method according to at least one of claims 27 to 38, characterized in that the lower and/or upper lacquer layer is applied by a flexographic printing process.
40. A method according to claim 39, characterized in that the lacquer layers applied by a flexographic printing process are applied in an amount of coating of altogether 3 to 12 g/m<sup>2</sup>.

41. A method according to at least one of claims 27 to 38, characterized in that the lower and/or upper lacquer layer is applied by a screen printing process.
42. A method according to claim 41, characterized in that the lacquer layers applied by a screen printing process are applied in an amount of coating of altogether 5 to 15 g/m<sup>2</sup>.
43. A method according to at least one of claims 27 to 38, characterized in that the lower and/or upper lacquer layer is applied by the offset printing process or by the indirect letterpress printing process.
44. A method according to at least one of claims 27 to 43, characterized in that the protective layer is applied to the substrate all over.
45. A method according to at least one of claims 27 to 44, characterized in that the flat substrate is provided with the dirt-repellent protective layer on its two main faces.
46. A method according to at least one of claims 27 to 45, characterized in that the flat substrate supplied in step a) is a paper-of-value sheet comprising a plurality of single copies for which the steps b), b<sub>1</sub>) and b<sub>2</sub>) are performed in the same run in each case.
47. A method according to at least one of claims 27 to 46, characterized in that the lower and upper lacquer layers are applied to the substrate in-line in a sheet-fed lacquering machine.